

# Approaches, methods and processes for innovative apiculture development: Experiences from Ada'a-Liben *Woreda*, Oromia Regional State, Ethiopia



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## Abbreviations

ARSD	Apiculture Research and Development Strategy program
CACC	Central Agricultural Census Commission
CSA	Central Statistical Agency
DA	Development Agents
EBA	Ethiopian Beekeeping Association
EEDD	Ethiopian Export Promotion Department
EIAR	Ethiopian Institute of Agricultural Research
EHBPEA	Ethiopian Honey and Beeswax Exporters Association
FTC	Farmers Training Center
HBRC	Holetta Bee Research Center
ILRI	International Livestock Research Institute
IPMS	Improving Productivity and Marketing Success of Ethiopian Farmers Project
ITC	International Trade Center
KTB	Kenyan top-bar
MoARD	Ministry of Agriculture and Rural Development
NGO	Non-governmental organizations
OoARD	Office of Agriculture and Rural Development
PLW	Pilot Learning <i>Woreda</i>
PRA	Participatory Rural Appraisal
SNNPR	Southern Nations, Nationalities and Peoples Region
STVS	Selam Technical and Vocational School
TVET	Technical Vocational and Educational Training

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## Executive summary

Apiculture is one of the important agricultural sectors that enables utilize natural resources that otherwise would be wasted, and contributes to the national food products through pollination. Apiculture neither affects other agricultural sectors nor causes environmental disturbance. In Ethiopia, apiculture has been practised for centuries around the country and its potential is well documented. However, apiculture is still operating in traditional ways implying the need for modernization. The current annual honey production in Ethiopia is estimated at approximately 24 thousand tonnes accounting for about 24 and 2% of the total Africa and world honey production, respectively (ARSD 2000). Ethiopia is also one of the five biggest wax exporters to the world market. An average of 270 t was exported per year over the period 1984–94, which in turn generated over Ethiopian birr (ETB)<sup>1</sup> 2 million per annum to the national economy. In spite of its potential, products obtained from this sector have been very low due to lack of improved bee management system, low quality of hive products and lack of skill by beekeepers. To this effect, the Ministry of Agriculture and Rural Development (MoARD) has formulated a honey and beeswax development and marketing plans for the country. The Improving Productivity and Marketing Success (IPMS) of Ethiopian Farmers project has also included beekeeping as one of the priority marketable commodities in a number of its Pilot Learning *Woredas* of which Ada'a-Liben *woreda* is one.

The main objective of the apiculture development study undertaken in Ada'a-Liben *woreda* was to identify the current beekeeping potentials, problems, and solutions through the introduction of market-oriented modern beekeeping practice. The study was initiated in 2005 and has been continuing up to now. Systematic and step-wise approaches were employed to assess the situation and implement the interventions. Interventions include activities ranging from production improvement to market assessment and institutional linkages between producers and stakeholders. For the assessment of apiculture potential and constraints, primary and secondary information collection methods were adopted. Primary information was obtained from interviews with farmers, *woreda* apiculture experts and development agents, Federal and Zonal governmental organizations (including the Ethiopian Institute of Agricultural Research (EIAR) and East Shoa Zone Cooperative Promotion Office). Secondary data were obtained from information compiled by the above-mentioned governmental organizations and the latest information was gathered from the internet. The main activities during the project implementation process were identification of pilot intervention sites, beekeepers mobilization and group formation, capacity building through visits and training and

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1. In January 2008, USD 1 = Ethiopian Birr (ETB) 9.2007.

constant demonstration and follow ups, as well as linking of beekeepers to credit facilities and markets.

During the last two years (2005–07) of intervention, 60 beekeepers received beekeeping training, 4 beekeepers associations were formed and received association certificates in Yerer, Godino, Denkaka, and Adulala area of Ada’a-Liben *woreda*. During this time about 40 transitional hives (Kenyan top-bar, KTB) and 80 wooden framed hives (Langstroth) were bought and obtained through donation in the intervention sites. In general during this intervention period, improvement in the management of apiary has been observed and the quantity and quality of honey produced have improved. This paper provides highlights of strengths and constraints of apiculture in Ethiopia. It describes apiculture development potential and works done to improve the existing production system in Ada’a-Liben *woreda* in particular. It presents IPMS intervention strategies and the lessons learned in knowledge sharing, capacity building, market linkage, and beekeepers group formation for better production technologies, input supply, and marketing and credit facilitation. This working paper also provides valuable information and/or shares good thoughts to those who have already launched or planning to launch apiary development program as an alternative income-generating activity at the household level.

# 1 Introduction

## 1.1 Background

Of all the countries in the world, no country has a longer tradition of beekeeping than Ethiopia (Ayalew and Gezahegn 1991). At the time of King Ezana, around the 3<sup>rd</sup> century AD, wax was needed for religious ceremonies and honey for nobility and the social elite for making traditional beverages. Despite its long history, beekeeping in Ethiopia is still an undeveloped sector of agriculture. The knowledge and skill of honey production and honey and beeswax extraction of Ethiopian farmers is still very traditional (MoARD 2006).

In many regions of the country, apiculture is considered as one of the income-generating activities for resource-poor farmers including women, youth and the unemployed sectors of the community. Apiculture also provides attractive options for rural employment and income generation in harsh agro-ecosystems where crop production is marginal and the risk of crop failure is high. There is a great potential in the country for working with communities by introducing minor and easily adaptable apiculture production system, leading to considerable gains in productivity beyond family consumption needs. The potential for improvement of the traditional honey and wax production has led to apiculture promotion as part of policy initiatives taken by the government of Ethiopia although they have been, in the past, defeated by the impact of major constraints and lack of appropriate research.

Low productivity and poor quality of bee products are the major economic impediments for rural beekeepers (Nuru 1999); however, they face another primary economic concern: lack of skill to manage their bees and bee products. Most of the rural beekeepers cannot afford to invest in inputs, process, pack, and transport their products to market to maximize profit. They produce a low quality product that they are forced to sell locally to wholesale buyers at prices much lower than in domestic commercial markets.

The Improving Productivity and Marketing Success (IPMS) for Ethiopian Farmers' Project being implemented by the International Livestock Research Institute (ILRI) commissioned Sap-Tec PLC to study the existing potential and execute apiculture development in Ada'a-Liben *woreda*, one of the IPMS' ten Pilot Learning *Woredas* (PLWs). The activities reported in this paper are based on studies and interventions undertaken to enhance market-oriented apiculture development in Ada'a-Liben *woreda* between 2005 and 2007.

This working paper is divided into a number of sections. The first two sections describe the major strengths and constraints of the bee industry in Ethiopia. Section 3 describes

the beekeeping institutes and associations. Sections 4 and 5 analyse the most important opportunities and threats for apiculture development and marketing intervention in Ada'a-Liben *woreda*. Section 6 presents IPMS intervention strategies and lessons learned in knowledge sharing, capacity building, and commodity development including technology transfer, platforms, input supply, credit facilitation and market linkage. This section also discusses the methods used and the achievements obtained so far. Finally, Section 7 discusses both general and industry specific recommendations, which form the basis for further development of the industry.

This working paper is intended to provide preliminary information on lessons drawn in beekeeping interventions in Ada'a-Liben *woreda* and to share the experiences to those who have already launched or are planning to launch apiary development program as an alternative income generating activity. It also highlights the methodologies applied and the lessons learned from the apiculture interventions of the IPMS project for scaling up to other *woredas*.

## 1.2 Objectives

The main objective of this apiculture intervention was to identify the current beekeeping practices, assess potentials and problems, and provide solutions through the introduction of a participatory market-oriented modern beekeeping practice as an income-generating activity to farmers and others who are interested to complement their income.

## 1.3 Work program, intervention approach and methodologies

Systematic and step-wise approaches were employed to assess the current situation and to implement the intervention in time and space. The major intervention areas included activities ranging from production improvement to market system establishment and institutional linkages between farmers and stakeholders. Different methods were adopted like baseline data collection and collation, group discussions, door-to-door visits, capacity building and demonstration and others. The preparation of this paper on beekeeping includes primary information from interviews with farmers, *woreda* apiculture experts and development agents, Federal and Zonal governmental organizations (including Ethiopian Agricultural Research Organizations and East Shoa Zone Cooperatives Promotion Office) and the latest available information compiled from different secondary sources, like the internet. Checklists under major topics of the study were prepared well ahead of time to ensure the completeness of the discussion and collection of other relevant primary data. The collection of relevant published information

was also carefully placed within the text. In the course of the study, the current apiculture production system, the biotic and abiotic constraints, intervention methods, institutional linkages and involvement in the project support in retrospect and prospects to disseminate the technology were considered.

## 2 Current status and trends of beekeeping in Ethiopia

According to MoARD (2003) the most important honey and beeswax production regions in Ethiopia are Oromia (about 46% of total production), Southern Nations, Nationalities and Peoples Regional State, SNNPR (22%), Amhara (25%) and Tigray (5%). In more detail, the major supply areas in the country include places like Sidamo, Jimma, Gondar, Wollega, Illubabor, Bale, and Gojjam.

The large majority of beekeepers in the country are still producing honey using traditional hives (MoARD 2003). Currently, beekeepers are thinly scattered all over the country. The prevailing logistic problem to reach every beekeeper coupled with the small quantity of bee products available in the hands of the beekeeper remains to be a disincentive to traders to be extensively engaged in bee products trading. In addition, the promotion of some agricultural inputs such as pesticides and herbicides for cereal crops production as well as the use of deadly chemicals for malaria eradication program have substantially reduced honey production (Gezahegn 2001). As a result, bee products marketing has retrogressively promoted to petty trading.

### 2.1 Bee management and production

#### 2.1.1 Bee races

There are five distinct races of honeybees in Ethiopia namely, *Apis mellifera jementica*, *A. m. scutellata*, *A. m. bondasii*, *A. m. monticola* and *A. m. woyi-gambella* (Amsalu et al. 2004). African bees are much more active in collecting nectar than temperate-zone bees. They produce wax readily, possibly in response to their need to build new combs frequently. They are very adapted and can live in tropical climates ranging from semi-desert to tropical rain forests.

#### 2.1.2. Honey

Honey has been highly prized for its flavour, as well as nutritional and medicinal values by the local communities. In areas deficient in other sugar sources, it is highly sought after for its sweetness and energy-giving properties.

According to information compiled in the National Apiculture Research and Development Strategy Program (ARSD 2000), Ethiopia ranks 10<sup>th</sup> and 4<sup>th</sup> in the world in honey and wax production, respectively. The current annual honey production is estimated at approximately 24 thousand tonnes, accounting for about 24 and 2% of the total Africa and world honey production, respectively. With this level of production,

the beekeeping farmers of the country gain approximately ETB 450 million annually. However, these resources are underutilized due to the traditional beekeeping methods that currently prevail in the country (ARSD 2000).

In Ethiopia, honey is almost exclusively used for local consumption, and to a very large extent (80%) for brewing of mead, locally called 'Tej'. Almost no wedding or other cultural, religious and social events can be imagined without the honey wine 'Tej'. Even though honey satisfies the local demand, it is so crude that it cannot compete in the international market (Ministry of Trade and Industry 1995).

### 2.1.3 Beeswax

Wax is useful primarily for honey comb, cosmetic industries, candle making, ointment and cream, varnishes and polishes, creating special forms and surfaces for artistic sculptures and for queen cups preparation to be used for queen rearing to develop and multiply bee colonies. In Ethiopia, wax is largely collected from traditional hives rather than the moveable frame hives. The wax yield from traditional hives is estimated to be 8–10% of the honey yield, compared to 0.5–2% from frame hives. The annual production of wax in Ethiopia is estimated at 3200 t (MoARD 2005). It is estimated that about 25% of the total beeswax production is 'lost' due to selling of honey with the wax (not extracted). This includes the loss of beeswax that is sold to consumers with the crude honey. Honey consumers chew the honey and spit out the remaining beeswax. The above estimate is without considering much of the beeswax produced in remote areas where it is usually wasted without harvest. However, with all this wastages Ethiopia still stands 4<sup>th</sup> in the world in wax production next to China, Mexico and Turkey (EEPD 2006).

### 2.1.4 Other beehive products

Royal jelly, pollen, and bee venom are also in very high demand globally. However, these products have never been utilized in the Ethiopian context (Ayalew and Gezahegn 1991).

### 2.1.5 Other roles of honeybees

Honeybees also play a crucial role as important and necessary pollinators of many plants and have demonstrated potential for increasing food crops, horticultural crops, and seed production. In terms of nutritional and economic benefit to people, the role of bees in crop pollination is even more important than their role as producers of honey and other products. In the absence of pollinators mainly honey bees, vegetable and seed crops and tree crops yield loss was estimated to be 26 and 43%, respectively (Buchmann and Nabham 1995).

### 2.1.6 Bee forage

In Ethiopia there are diverse and unique flowering plants, and over 7000 species of flowering plants exist in the country. The flowers of most of these plants are suitable to feed larger number of bee colonies, and are currently underutilized. It is estimated that more than 10 million honeybee colonies are found in Ethiopia (ARSD 2000). Nevertheless, the bees and the plants they depend on are constantly under threat from lack of knowledge and appreciation of these natural resources. Clearing of land for agriculture, charcoal making, settlements and deforestation through time have affected biodiversity of honeybees and plant flora they depend on. In many places beekeepers have made efforts to redress the situation by planting good honey plants near their hives. Despite these local efforts, the national beekeeping resource base is deteriorating at a faster rate warranting sustainable intervention programs.

## 2.2 Honey and other bee products markets and marketing

Honey is almost exclusively used for local consumption, mainly for the brewing of mead, also called *Tej*. Even though the national honey production satisfies the local demand, it is so crude that it could not compete in the international market. To this effect, an average of 3000 t of honey per annum has been exported to neighbouring countries over the years 1984–94. Ethiopia is one of the five biggest wax exporters in the world market. An average of 270 t of wax was exported per year over the period 1984–94, which in turn generated over ETB 2 million per annum to the national economy. Export of honey and beeswax is estimated to contribute an average of USD 1.6 million to the annual national export earnings (EEPDP 2006).

In the year 2004 the quantity of honey and beeswax exported amounted to 15.72 and 305 t, respectively. The total export earnings from honey and beeswax were ETB 481,266 and 8.366 million, respectively (MoARD 2005). Although the annual production of both honey and wax is large compared to other African countries, the system of production commonly exercised is traditional. Almost the entire production is achieved by using traditional beehives, comprising a wide range of some times very sophisticated models. Productivity of honeybees is very low and only an average of 5–6 kg of honey could be cropped/hive per year. However, in areas where improved technology has been introduced, an average of 15–20 kg/hive per year has been recorded. The major constraints that affect apiculture in Ethiopia are lack of beekeeping knowledge, shortage of trained manpower, shortage of beekeeping equipment, pests and predators and inadequate research and extension services to support development programs (SOS–Sahel-Ethiopia 2006).



## 2.3 Government policy

Extension activities on beekeeping started in Ethiopia in 1978. Since then, considerable efforts have been made to improve apiculture production through training, introduction of new technologies, production and distribution of equipment and institutional capacity building. Great attention has also been given to training of extension workers and farmers in apiculture so that they could acquire better beekeeping knowledge and develop skills enabling them to improve the backward bee culture and increase the production of honey and beeswax.

The Animal and Fisheries Development Department under the Ministry of Agriculture and Rural Development has formulated a short-, medium- and long-term comprehensive honey and beeswax development and marketing plans (MoARD 2003). The main objective of the development plan is to improve the quantity and quality of honey and beeswax produced in the country. This goal will be attained by implementing a set of extension packages, which include, *inter alia*, training of beekeepers in matters related to honey and wax production and extraction, introducing modern production technologies and facilitating beekeepers to be organized in service cooperatives so that they can collectively have adequate volume of marketable bee products, develop marketing strength and have easy access to inputs required for the production of honey and beeswax. Furthermore, the extension package of the MoARD is not geared towards replacing the traditional hives with the modern type; the tendency is to gradually replace traditional hives with intermediate (top bar) and modern hives (MoARD 2003).

The extension package of the MoARD is to initially implement the program in 256 selected *woredas* (districts). The districts are delineated as very high potential and high potential areas. The ministry plans to include about 2000 beekeepers in its extension package in each of the selected districts, 60% of whom will be assisted to develop and implement wooden frame hives, while intermediate hives (top bar) will be introduced for the remaining 40% of the selected beekeepers. The extension package also indicated that the country's total annual production of honey, including honey and beeswax from the traditional hives, is expected to increase to 149 thousand tonnes and that of beeswax to almost 10 thousand tonnes over a period of 10 years ( MoARD 2003).

## 3 Beekeeping institutions

### 3.1 Overview

The MoARD and some international NGOs (e.g. SOS-Sahel in Amhara Region) have initiated a development strategy aimed at improving the quality and quantity of honey and beeswax production in the country. At the national level, the MoARD is responsible for the overall development of apiculture in the country. The Holetta Bee Research and Training Center, the Assela and Agarfa Agricultural Technical and Vocational Educational Training Centers (ATVETs) also provide capacity development programs in apiculture. Farmers Training Centers (FTCs) have been involved in the production of trained manpower and beekeeping extension activities.

Following the establishment of the Regional National States, the Regional Agricultural Bureaus of the respective Regional States have taken up the responsibility of the sectoral development. Other institutions involved in the development program are the Wondo Genet College of Forestry, and development corporations such as the Coffee and Tea Development Enterprises and the State Farms Corporation.

Although the Holetta Bee Research and Training Center has no mandate to conduct basic research, it is the only institution that undertakes adaptive and applied research on apiculture (HBRC 2003). The research conducted so far encompasses improving the quality of hive products, identifying honeybee races and honeybee flora, survey and diagnosis of honeybee diseases, pests and predators. No other agricultural research institutes, universities and colleges have started research activities in this sub-sector.

The Holetta Beekeeping Station (which is currently upgraded to Bee Research and Training Center) has been responsible for beekeeping training in the country. The Agarfa Farmers Training Center was also involved in the training of farmers. A total of 873 extension staff and over 50 thousand farmers have been trained over the last two decades in the above mentioned centres. The TVETs (Agricultural Technical and Vocational Educational Training) are providing training to development agents on beekeeping as part of government efforts to transform rural agriculture through extension service.

### 3.2 Beekeepers associations

#### 3.2.1 Shoa Beekeepers Association

The association is located in Adama town in Oromia Regional State. The major activities of the association are honey and beeswax production and processing, honey and beeswax collection and supply.

### 3.2.2 Ethiopian Honey and Beeswax Exporters Association (EHBPEA)

The objectives of the association is to conduct studies on major problems of apiculture development in Ethiopia and to prepare proposals on behalf of member companies and submit the same to the government and find solutions jointly; provide support by connecting member companies to create business linkages and good relationship among themselves; keep the common interest of member companies by conducting market studies, establish information exchange and healthy competition among themselves; encourage member companies to generate income by selling quality products; find ways and means to get grant for member companies in terms of money in kind; introduce business policies, rules and regulations to member companies; and participate in the workshop, conference and training prepared locally or abroad on behalf of member companies located in Addis Ababa.

### 3.2.3 Ethiopian Beekeeping Association (EBA)

The Ethiopian Beekeeping Association (EBA) organizes conferences, workshops, seminars, and panel discussions; publishes newsletters and reading materials related to apiculture in Amharic and English; creates networks with sister organizations and societies; supports environmental protection and aforestation programs; and creates awareness to conserve biodiversity.

## 4 Beekeeping in Ada'a-Liben *woreda*

### 4.1 Bio-physical environment of Ada'a-Liben

During the period of the study, Ada'a-Liben was one *woreda*. However, in 2006 the *woreda* was split into two; namely Ada'a *woreda* and Liben *woreda*. Since the study was initiated before the split, the authors will stick to the previous name and administrative demarcation. Ada'a-Liben *woreda* is one of the 12 *woredas* in East Shoa Zone of Oromia Regional State. It is located about 45 km southeast of the capital, Addis Ababa, and is very close to the other major urban centres (Figure 1). The *woreda* covers an area of 1750 km<sup>2</sup>, stretching east of the Bole International Airport to the North West of the Koka Dam. The human population in urban areas of Addis Ababa, Adama and Bishoftu create a large market for most agricultural commodities produced in the *woreda* (IPMS 2004).

The agro-ecology in the *woreda* is best suited for diverse agricultural production. There are a number of rivers and crater lakes that are being used for irrigated agriculture, particularly for horticultural crops production. The *woreda* is nationally known for its best quality teff production, which dominates the agricultural production system. Wheat is also cultivated in sizeable quantities in medium to high altitude areas. Pulse crops, especially chickpea, are grown in the bottomlands and on residual moisture in selected areas. Lentil is also grown to a lesser extent. Horticultural crops, mainly vegetables, are produced under irrigation. Livestock production is an integral part of the production system. Production of cattle, sheep, goat and poultry is a very common practice and there is an existing market-oriented production system. There is also a fast growing smallholder dairy production system with a strong milk marketing cooperatives involving over 800 smallholder dairy farmers. Honey production is another occupation of farmers in specific sites of the *woreda*. There are a number of farmers' service cooperatives in the *woreda* and they have established a strong cooperative union, known as Yerer Union. The Union provides input supplies and marketing services for the major agricultural activities. Depending on the agro-ecology, there are low, medium to high potential areas in the *woreda*.

According to CACC 2003, the total agricultural population of the *woreda* is estimated at 202,276. There are 60 Peasant Associations (45 rural and 15 urban) in Ada'a-Liben *woreda*. About 78% of the household populations who are over 10 years of age are engaged in full agricultural activities, 19.5% in partial and 2.6% in non-agricultural activities.

According to Ada'a-Liben OoARD (2004), three agro climatic zones are identified in the *woreda*.

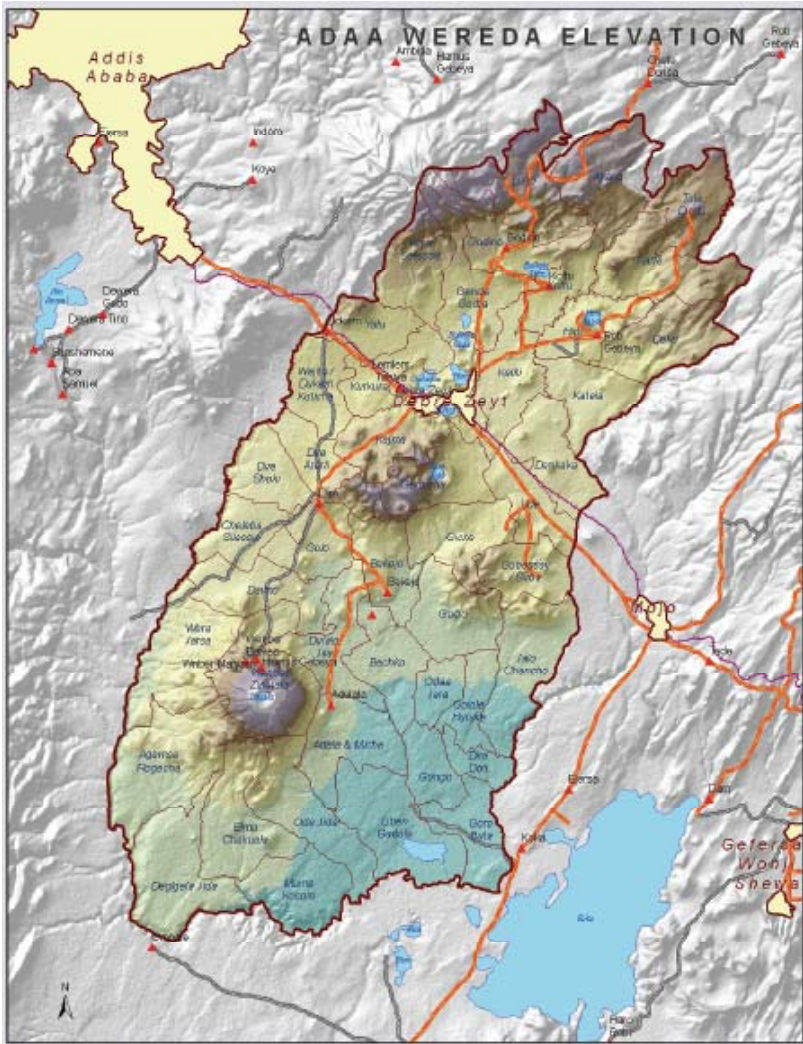


Figure 1. Elevation map of Ada'a-Liben woreda (2005).

- The Rift Valley zone ranges from 1500–1800 m, which covers about 600 km<sup>2</sup>, representing 34% of the area
- The mountain zone located over 2000 m, covering 150 km<sup>2</sup>, representing 9% of the area.
- The highland zone extending over 2000 km<sup>2</sup>, and representing 57% of the area at an elevation of 1800–2000 m.

There are two cropping seasons in the area. *Belg* (short rainy season) from March to April and *Meher* (main rainy season) from June to September. *Belg* rains are mainly used for initial breaking of the soil for *Meher* crops and animal feed. *Meher* rains which account for about 74% of the annual precipitation are the most economically important rains

for crop production. March, April and May are the hottest months and November and December are the coldest months. The long-term (1953–2003) average rainfall recorded by ILRI Debre Zeit and EIAR Debre Zeit Agricultural Research Centre was found to be 839 mm. Mean minimum and maximum temperatures recorded for 27 years ranged from 7.9°C to 28°C, respectively. Mean annual temperature for the same period was 18.5°C (IPMS 2004).

## 4.2 Ada'a-Liben beekeeping experience, research and extension

In the *woreda*, there are about 1260 beekeepers and the majority of them are traditional beekeepers that inherited the skill from their forefathers (Ada'a-Liben OoARD 2004). The 2001/2002 census report of Central Statistics Authority (CSA 2003) indicated that there were a total of 3274 beehives in the *woreda*, of which 3150 were traditional, and 38 were modern hives. The modern beehives were provided by an NGO called Lutheran Foundation that operated in the *woreda* mainly in Adulala (Zuquala) area 4–5 years ago.

Honey utilization in the *woreda* showed that 90% is used for sale and only 10% is used for household consumption. Institutes that are directly and indirectly involved in apiculture development in the areas were critically reviewed during the current study period believing that they will contribute to the promotion of the sector.

Although there is a Cooperatives Promotion Office in the *woreda*, Ada'a-Liben beekeepers were not aware of or have not been organized to receive any service from the office. There are four micro-credit institutions in Ada'a area that are potential financial source for the beekeeper cooperatives. However, beekeepers were not using this facility due to lack of institutional linkage between beekeepers, cooperative offices and micro-finance offices. There is only one NGO called Mekaneyesus that works on beekeeping in Adulala area and started supporting farmers by providing them with modern beehives and other accessories on credit basis.

Information on input suppliers is not available to the beekeepers or the stakeholders in the area. Thus, potential producers and suppliers of beekeeping equipments in the area were not linked. Information exchange between beekeepers and potential buyers around the area including local wholesalers, an agro-industry, and honey and wax processors were not sufficient. There is no research–extension–farmers' linkage for apiculture development in Ada'a-Liben *woreda*.



## 4.3 Potential for beekeeping

Based on the surveys and studies conducted on current status of beekeeping in Yerer and Zuquala watersheds, the potentials for apiculture development was enormous because of the following factors.

### 4.3.1 Readiness of beekeepers to take up modern technology

All beekeepers, women and men, who were contacted during the study, were very interested and ready to adopt modern beekeeping technologies. They fully assured that, if assisted with minimum inputs like training, demonstration and information, they would like to be model beekeepers for the *woreda* and beyond.

### 4.3.2 Availability of feeds and water

The *woreda* is very special for its diversified acacia and shrubs *sp.* and there are also different kinds of forage trees (Wanza, Girawa, Eucalyptus tree) which flower at different times of the year that assures a constant supply of feed for bees. There is also enough water supply especially around the Yerer and Zuquala watersheds in Korke, Godino, Denkaka and around the Debre Zeit town. The study team also learnt that farmers were well aware of the need of supplying their bees with additional feeds and water whenever needed.

### 4.3.3 Availability of strong colonies and good yield

During the survey, it was noted that there are a lot of beekeepers in the *woreda* with good numbers of beehives (3–40 per household) full of strong bee families, indicating that the area is very suitable for bee business development. The survey also showed that production of honey per traditional beehive per season ranges from 3 to 7 kg, with an average production of 4.61 kg. Honey production from modern beehives ranged from 10 to 15 kg, with an average of 14.4 kg per beehive per harvest. The average frequency of honey production is twice a year. Beekeepers harvest most of the comb and leave some for colony continuity.

### 4.3.4 Market access

According to the results of the study, beekeepers have no problems with honey marketing in the *woreda*. In fact, honey produced in the area is sold mainly at village level and the rest is sold on the road side market of Dukem town at much higher price than at the village level. The average price of honey in the village level is ETB 27.50/kg and at Dukem town is ETB 45/kg.

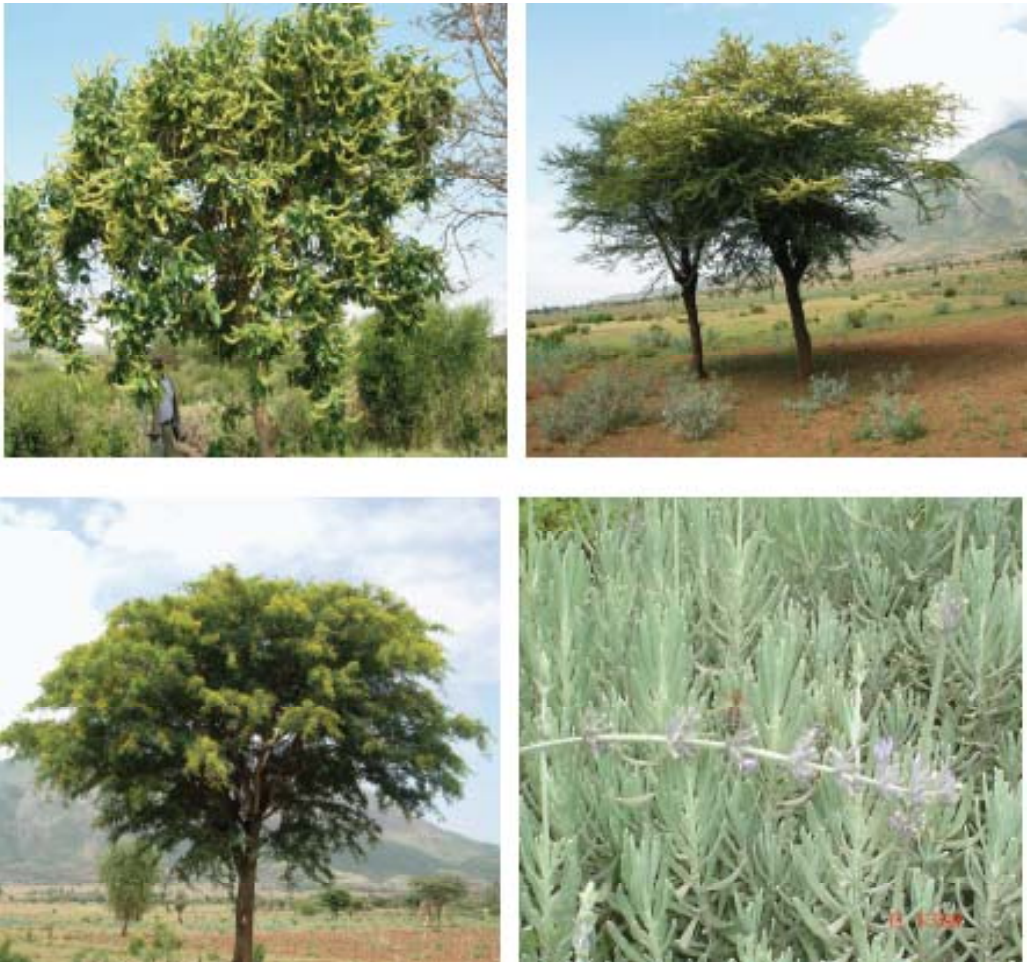
#### 4.3.5 Diversity and seasonal availability of bee forages

The major honey flow season is from October to November and the minor flow season is from May to June, and depends upon the availability of bee forage that in return depends on the amount of rainfall. The major bee forage plants identified in the *woreda* are presented in Table 1 and some of the bee forage plants are shown in Figure 2. Most of these plants are found in the Yerer and Zuquala mountain watersheds. In these watersheds, there are forest reserves with plenty of streams and rivers that allow the expansion of apiculture development. There are also areas allocated for forest development and soil conservation works. Thus, these areas are candidates for the introduction of multipurpose trees useful as bee and animal forage, soil conservation and soil fertility.

**Table 1.** Lists of some bee forage plants and their flowering period in Ada'a-Liben woreda

Plant type	Vernacular name	Common name	Scientific name	Flowering period
Trees	Bahir Zaf	Eucalyptus	<i>Eucalyptus camaldulensis</i>	Throughout the year and profusely after rains
	Girar (wacho)	Acacia	<i>Acacia seyal</i>	August–February
	Girawa		<i>Vernonia amygdalina</i>	December–May
	Besana		<i>Crotom macrusachys</i>	April–July
	Kinchib	Euphorbia	<i>Euphorbia toritoli</i>	All year round and profusely after rains
	Wanza	Podocarpus	<i>Cordia africana</i>	October–March
	Tedecca	Acacia	<i>Acacia negrii</i>	August–September
	Tiqur Berbera		<i>Schinus molle</i>	Flowering all year round and profusely after rains
Bushes	Lukina	Lead tree	<i>Leucaena leucocephala</i>	Flowers profusely after rains
	Sensel		<i>Justitia schimperana</i>	All year round
	Gesho	Hopes	<i>Rhamnus prinoides</i>	All year round
	Agam		<i>Carissa edulis</i>	All year round
	Qega		<i>Rosa abyssinica</i>	All year round
	Koshim		<i>Dovalis abyssinicus</i>	All year round
	Kazamier	Kasmer	<i>Casimiroa edulis</i>	All year round
Shrubs	Tosegne		<i>Satureja spp</i>	September–December
	Tenjut		<i>Otostegia integrifolia</i>	All year round
	Asta	Asta	<i>Ericca arborea</i>	All year round
	Mech		<i>Guizatia scabra</i>	August–February
	Adeye Abeba	Meskel flower	<i>Bidens spp</i>	September–December
Crops	Bakela	Horse bean	<i>Vicia faba</i>	September–October
	Ater	Beans	<i>Pisum sativum</i>	September–October
	Shmbera	Chickpea	<i>Cicer Arietinum</i>	October–February
	Suf	Safflower	<i>Carthamus tinctorius</i>	November–February
	Yeferenj Suf	Sunflower	<i>Helianthus annuus</i>	
	Denech	Potato	<i>Solanum tuberosum</i>	April





**Figure 2.** Some of the bee forage plants found in Ada'a-Liben woreda.

The woreda is also known for fruits, horticulture and floriculture production. Thus, integration of apiculture development in the agriculture production system has a huge advantage for pollination. Farmers were encouraged to plant multipurpose trees that are useful for bee forage, control soil erosion, and use for animal feed. Possible intervention areas like river banks, watering points, forests and enclosure areas can be used for bee feed development.

## 4.4 Major constraints to apiculture development

### 4.4.1 Limited knowledge about the potential of the area

The main problem to the beekeeping sector in Ada'a-Liben woreda was that the relevant government offices have limited knowledge about the natural potential and constraints of bee farming in the woreda. Most of the experts in the woreda OoARD did not have clear

idea about the existing system and the potential for development of apiculture in the *woreda*. As a result, the sector was not considered as a priority marketable commodity in the strategic plan of the *woreda* OoARD. However, during a Participatory Rural Appraisal (PRA) study conducted by the IPMS project and collaborators, farmers identified apiculture as one of the priority marketable commodities in the *woreda*. Subsequently, IPMS experts and an external study team confirmed the high potential of market-oriented apiculture development in the area.

#### 4.4.2 Lack of knowledge and skills on beekeeping

During the survey, the study team encountered apiaries which are managed badly by the beekeepers (Figures 3 and 4). Some of the problems observed were hives not placed properly, have no shades and poor hive sanitation. In the surroundings, 65% of the hives visited were covered by weeds and bushes. Fifty-five percent of the hives inspected had very black old wax combs and were infested with wax moths.

It was learnt that almost all the bee farmers in the *woreda* did not get any formal and informal training in modern beekeeping technologies before the interventions by the IPMS project. However, some years ago, the Lutheran Foundation had sponsored for training and provision of some modern beehives in Zuquala area which later on ended up without success due to lack of proper follow-up and inadequate knowledge of farmers in the area.

#### 4.4.3 Lack of established systems

It was identified that there was no viable system or organization which really supports the beekeepers to improve their production systems and marketing their products.

#### 4.4.4 Lack of institutional linkage

There were no trained beekeeping experts or extension workers who can render important advisory services to the farmers. The bee farmers had no relationships with other beekeeper associations and marketing institutions, which may help them promote their production systems and markets their products.

#### 4.4.5 Information gaps

There was no recorded data on beekeeping activities by the *woreda* OoARD. There was no information about the location of the beekeepers, who they are, when, how and how much they produce, the frequency of harvest, problems of apiculture, what they do with their produce, market linkages and marketing systems, prices etc.



**Figure 3.** *Traditional beekeeping practices with poorly managed beehives.*



**Figure 4.** *Poorly and wrongly managed modern beehives.*



During this study, it was found out that all the beekeeping activities in the *woreda* were traditional. Farmers neither got extension services nor had institutional linkages with regard to apiculture production and marketing. The farmers never had any exposure or model demonstrations to improved apiculture production.

#### 4.4.6 Diseases and insect pests

The management of beehives in most traditional hives was not good. Diseases and pests that attack bees and combs were encountered in many traditional apiaries. The common pests in the apiaries were insect pests like wax moths, birds, lizards, and snakes.

#### 4.4.7 Agricultural chemicals

Farmers in the *woreda* primarily produce teff, wheat, chickpeas and horticultural crops. They use various types of pesticides and herbicides without due consideration to damages caused on bee colonies. Farmers indicated that a number of bee colonies either die or abscond their hives due to the extensive use of agro-chemicals in the *woreda*.



**Figure 5.** Extensive use of agricultural chemicals in Ada'a-Liben woreda.

#### 4.4.8 Harvesting

Traditional beekeepers and honey hunters have developed various ways of harvesting and utilizing honey and other hive products. The traditional hive allows every comb to be used both for egg laying by the queen and for honey and pollen storage by the workers. Extracted honey, therefore, includes brood and pollen, which is destructive and contaminating. Destroying broods while harvesting slows regeneration of bee populations and impedes sustainable production.

## 5 Marketing bee products in Ada'a-Liben *woreda*

### 5.1 Overview

The results of this study indicated that there were no problems identified for honey marketing in the entire target rural *kebeles*. As the honey producing farmers indicated, they were able to sell either the comb or crude honey at the road side of Dukem town or retailers come to their homes and collect the honey with the price of ETB 20–25/kg. They used to sell a major portion of the honey to traders coming to their home. The traders or the retailers usually sell the same honey to consumers at ETB 30 or more per kg. The long tradition of selling honeycombs has created a unique opportunity to sell honey at higher price per kg as compared to selling honey mixed with wax in containers.

### 5.2 The Dukem roadside honey market chain

During this study, it was found out that the traditional Dukem roadside comb-honey market chain stretches from Yerer watershed area to Dukem town. The main customers for this product are travellers along the main road from Addis to east and southern Ethiopia. As the main honey producers indicated, this marketing system has been going on for over 60 years and there is no honey-market problem in the study villages. They underlined that they used to sell their comb or semi-processed honey to retailers and consumers at a better price than in any other parts of the country.

All the interviewed beekeepers said that they could sell a major portion (90%) of their honey right in the village to the retailers coming there with their trays. Three to five big trays from the town were to stay with each beekeeper waiting for the harvest. A 10–15 kg comb-honey on the tray is estimated to be sold for an average ETB 200–300/tray depending on the quality and size of the honey on the tray.

**Table 2.** *Honey and wax products utilization*

Description	Percentage
Market	90
Sale of honeycombs	95
Unprocessed honey and wax	5
Home consumption	10
Market place	
Village	97
Nearest town (Dukem)	3

Ato Birhanu Mekbib is one of the best young honey producers and sellers from Yerer area. He gained the knowledge from his father and grandfather. He has now more than 37 traditional and two transitional hives. Comb-honey selling and earning good amount

of money is the tradition of his family. He said he earns at least ETB 3000 to 5000 every year from the sale of honey. Ato Upullo T/Silasie and Ato Dinku Anbesie from Korke areas are potential beekeepers who supply comb honey to Dukem roadside market.

W/ro Elfinesh, Ato Shume and Ato Tadesse from Denkaka have a good number of traditional and transitional hives and used to collect ETB 2000 to 3000/year from the sale of comb-honey. From Dukem town, Ato Abera Asfaw, Ato Birara Bulcha and Ato Ketema are the major honey collectors from the Yerer and Denkaka areas. They do not use the comb-honey for the 'Tej', but rather retail it at the roadside using agents.

Those farmers who were interviewed have 6 to 37 traditional hives per farmer and used to sell their honey and earn ETB 600 to 5000 per year. They usually harvest 2–3 times a year. Mostly they sell their honey to retailers who either come to their home or the farmers directly take the produce to Dukem or Debre Zeit themselves to the traders.

Now these farmers are linked to the Beza Mar Company in Adma town, 50 km further east of Ada'a-Liben *woreda*. Farmers from the four rural *kebeles* produced different quantities of honey and are selling it for different prices. Average honey price harvested from the traditional and transitional hives at the four rural *kebeles* from October 2006 to December 2006 is presented in Table 3.

**Table 3.** Average honey price (October–December 2006)

Production sites	Description of market place and comb honey average price (ETB/kg)	
	Farm gate	Dukem town
Godino	27.90	45
Denkaka	27.91	45
Yerer	28.03	45
Adulala	26.10	45

### 5.3 Role of women in honey marketing

Women have less participation in the harvest and marketing of bee products.

Traditionally, beekeeping is considered as a man's job. There are only two women beekeepers that are organized in the Ada'a beekeepers associations. However, the participation of women in any agricultural production and marketing activities has been increasing recently, partly because of the increasing number of women-headed households in the rural farming community. The increasing number of women-headed households is attributed to death of a husband, divorce, and some degree of improvement in family land inheritance and public awareness on gender.



**Figure 6.** *Roadside honey comb marketing between Dukem and Debre Zeit towns.*



**Figure 7.** *Marketing honey in a rural shop.*

## 5.4 Marketing constraints

Low productivity and quality are the major economic impediments for the development of rural beekeeping; however, producers face another primary economic concern: lack of market options. Few rural beekeepers can afford to process, pack, transport, or market their products to maximize profit. They produce a low quality product that they are



forced to sell locally to wholesale buyers at prices lower than the domestic commercial centres or in the export markets. For instance, traditionally produced honey in the Asossa area is sold to wholesalers at about ETB 7–10/kg, while the same type of honey is sold at ETB 20/kg in Debre Zeit, and at ETB 30/kg in Addis Ababa. Pure honey commands even higher prices.

## 6 IPMS strategies and interventions

### 6.1 Overview of the intervention approach

The IPMS project intervention in the pilot *woreda* is a marketable commodity development approach. Marketable commodities were identified through PRA analysis with the participation of all stakeholders including farmers, extension staff, researchers, Union, micro finance institutes and traders. Among the seven marketable commodities identified during the initial PRA exercise in Ada'a-Liben, apiculture was dropped out. However, based on the request of subject matter specialist (SMS) of the *woreda* and observations on honey marketing on the road side of Debre Zeit and Dukem, the project decided to conduct a survey on production and marketable potential of apiculture in Ada'a-Liben *woreda*. The project partnered with SAP-TEC Consultancy firm to conduct the survey, and the result proved that Ada'a-Liben has a production and market potential in apiculture. The second step was then to initiate interventions on apiculture development. The intervention was initiated in four selected sites, i.e. Yerer, Godino, Denkaka, and Adulala (Zuquala) rural *kebele*. These sites were selected based on the number of beehives owned and amount of honey produced, availability of bee forage plants, and the interest of the beekeepers to participate in the program. The grid references (Table 4) and of the intervention sites (Figure 8) are presented below.

**Table 4.** Geographic information of intervention areas

Position	Unit	Yerer	Godino	Denkaka	Delolajila
Altitude	masl	2118–2111	2110–2101	1864–1853	1725–1735
Longitude	East	37° 05'	37° 03'	37° 05'	37° 04'
Latitude	North	9° 8'	9° 75'	9° 6'	9° 4'

The following sub chapters explain the process and approaches used in each intervention and activities conducted step by step in order to help farmers to capture and apply knowledge in apiary. The intervention on this subject can be broadly subdivided into seven:

### 6.2 Production interventions

#### 6.2.1 Apiary site selection

For the establishment of an apiary one has to consider factors conducive to production. Criteria for site selection include an area free from human and animal interference, and availability of water and bee forages.

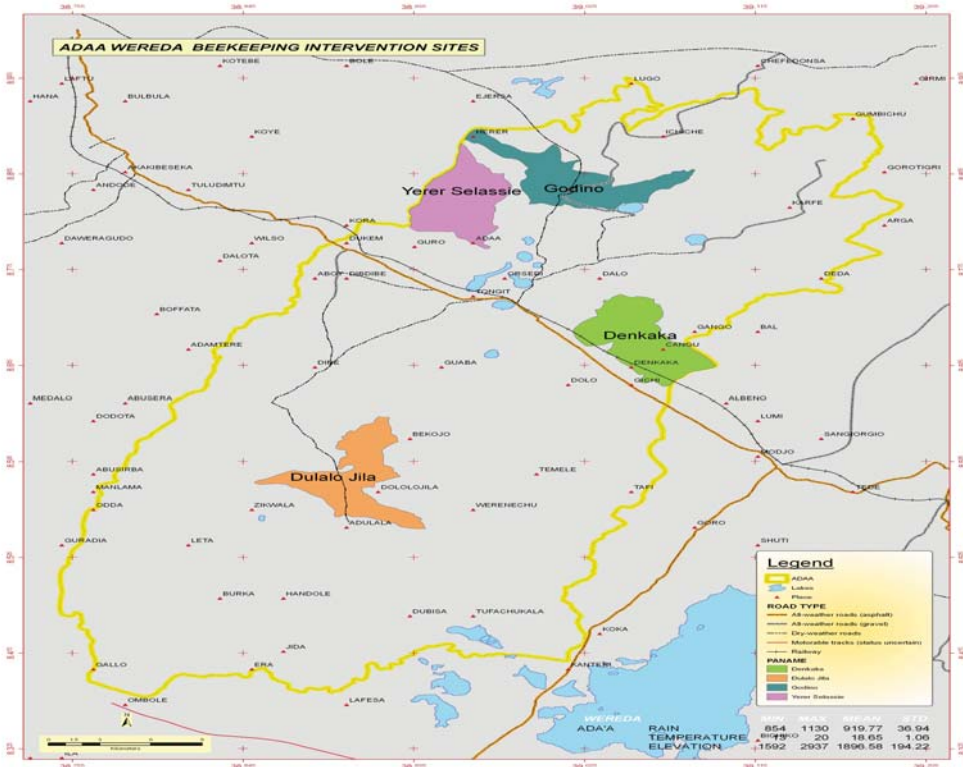


Figure 8. Relative distribution of the location of the four rural kebeles in Ada'a-Liben woreda.

## 6.2.2 Beehives

Management of beehives is one of the areas that need attention and improvement. Beehives should be protected from insect pests and predators. The area should be free from vegetations that restrict bees' free movement and harbour pests.

Changing the traditional beehives to modern beehives for a higher quality honey production was considered through farmers' participation in the apiary project. However, to convince the participants and their neighbours, demonstration has a strong power. The IPMS project in collaboration with the staff from Ada'a-Liben OoARD selected two voluntary farmers in two sites for demonstration of the three different beehives: the traditional, transitional and the modern beehives. The first step was to work with the traditional and transitional hives. Based on the results of the two hives and knowledge attained, it was planned to move on to the modern Langstroth wooden frame hive. During the demonstration process, farmers were invited to learn some of the new practices like colony transfer from traditional to transitional beehives and some of the

routine techniques of beehive management and sanitation. During the honey harvest period, farmers were invited to the demonstration places for assessment and comparison of outputs of the two (traditional and transitional) hives. Farmers observed and testified that better yields could be obtained from the transitional than the traditional hives.

Following the demonstration and the results achieved, about eight farmers immediately ordered transitional beehives with their own cash through the linkage already formed with a private input supplier. A number of other farmers requested for credit facilitation to purchase beehives. Following the needs for regular input supply and credit facilitation to all farmers needed to have the access, the idea of forming farmers' organization was conceived. The Office of Cooperative Promotion at the *woreda* level was contacted, and four beekeepers associations were legally established after a series of meetings and trainings.

### 6.2.3 Bee colony

For a successful honey production, the quality and characteristics of bee colonies are decisive. Beekeepers should keep non-aggressive and productive bees. Bee colonies with non-aggressive behaviour and good productivity can be obtained by catching swarms originated from colonies with known background or using colony splitting techniques. Also bee colonies in the apiary should be free from diseases and pests and this needs regular hive inspection.

In Ada'a-Liben *woreda* beekeepers do not practice queen rearing and there is no established market for bee colony. However, colonies are purchased from beekeepers through individual contacts. Bee colonies sold by these individuals are obtained by trapping swarms using hives. In Ada'a-Liben *woreda* the average price of a bee colony is ETB 100. The demand for bee colony warrants training of beekeepers in queen rearing techniques.

### 6.2.4 Bee feed supplements and forage plants

Supplementary feed is needed for bees especially during the dry season. Beekeepers in Ada'a-Liben *woreda* are aware of this fact and they supply sugar and ground beans to their bees during the dry season. Planting bee forage trees and flowers is not a common practice in Ada'a-Liben area and initiation of this activity is under way. The beekeepers' cooperative in Adulala area has obtained 10 ha of land for community apiary. They have planted flowering plants and protected the area from human and animal interference. They have planned to construct shades for hives using grasses collected from the land and introduce hives in the next production season.



**Figure 9.** Beehives kept in good conditions under shades: (a) traditional hives; (b) traditional and transitional (Kenyan top-bar, KTB) hives; (c) transitional and modern hives; and (d) modern hives.

### 6.2.5 Harvesting

Moisture content is one of the most important parameters to be considered in the quality of honey. When the moisture content of honey is more than 19%, it is liable to fermentation and gets spoiled in a very short time. High moisture content is a problem in honey production in the Ada'a-Liben *woreda*. Thus, beekeepers were advised to harvest honey when it is mature, i.e. when more than 75% of comb cells are sealed. The most common smoking material in the *woreda* is burning of dried cow dung and the intensity of smoking gives unwanted odour and reduces the quality of honey.

### 6.2.6 Post harvest handling

The method of separating honey and wax and storage of honey is crude and is often exposed to contamination. Honey is usually separated by heating honeycombs under the sun and then squeezing by hand. This practice exposes the product to dust and other

foreign materials. Very few beekeepers use sieves (metal or cloth) to further clean wax fragments and remove dead bee parts.

Storage and transport is also an area that needs intervention. Commonly used honey containers in Ethiopia include skin, hides, clay pots, gourd pots and tins. These are not conducive tools to store honey because they absorb moisture and raise the moisture content of the honey. Some of the tin and plastic containers often lack cleanliness. Containers like hides and skins add undesirable odour to honey. In Ada'a-Liben, the most common honey containers are metal trays to store intact honeycombs and plastic and tin containers to store mashed honeycombs.

In the case of Ada'a-Liben, 90% of the harvest is sold as honeycombs in trays. The problem of post harvest is minimal as compared to other parts of Ethiopia. This method of selling honey is not prone to adulteration problem, i.e. mixing of honey with other materials and sugar syrup. Since most of the honey produced is sold unprocessed, wax is not available for sale in the *woreda*.

During training programs, lessons were given to farmers on handling honey and other bee products properly and clearly. They were advised to use clean containers for honey made of plastic or nickel that does not have odour from substances. The container should be kept air tight and placed in a cool and dry place during storage and should be transported on the same type of containers.

### 6.2.7 Use of agricultural chemicals

Farmers in Ada'a-Liben area use insecticides and herbicides especially for teff production. This is a potential set back for beekeeping. Chemical poisoning problems could be managed by scheduling pesticide applications at times when bees are less active and by keeping bees inside the hive during application. It was also demonstrated that feeding apparatus could be fitted on hives to enable bees feed while inside the hive. This system is also useful during shortage of bee forage.

## 6.3 Inputs required for establishment of an apiary

### 6.3.1 Apiary establishment

Proper shades and hive stands are necessary for an apiary. Shades often have wooden poles and shelves to place hives and roofs made from grasses and/or corrugated iron sheet.

### 6.3.2 Beehives and accessories

Three types of hives (traditional, transitional (KTB), and wooden framed hives (Langstroth) are often used by beekeepers around the country. The hive accessories needed and their estimated prices for the different hives are listed in Table 5.

**Table 5.** Prices (in USD) of beekeeping equipment and materials

Item description		Local	Imported
Production			
1	Traditional hive	1–2	
2	Transitional hive (KTB)	40	
3	Wooden framed (Langstroth) (two suppers)	58	50
4	Queen cages	1	5
5	Queen excluder	4	5
6	Beeswax	5/kg	
7	Wooden stand	2	
8	Sickles	1.8	
10	Bee colonies	11–17	
Protective devices			
1	Gum boots	4.6	10
2	Overalls	4.6	10
3	Veils	3.5	5
4	Gloves	3	4
Harvesting and extraction			
1	Smoker		10
2	Bee Brush		3
3	Forks	1	2
4	Honey extractor (3 frames)		267
5	Plastic pails	2	
6	Sieves (sets)		55

Linkage was also established with modern bee equipment supplying local companies who are genuine with cheaper prices such as: Selam Technical and Vocational School (STVS) and Ato Desalegn, who are well known for their quality and as relatively cheaper bee equipment producers. Neway Trading Company, importer of different agricultural and sanitation equipment, was also contacted to get some important beekeeping materials such as honey extractor, queen excluder, wax printer, different sizes of sieves and strainers.

### 6.3.3 Feed supplement and forage plants

Often sugar and bean flours are used as feed supplements to bees. Flowering plants are planted in apiaries as bee forage during dry periods.



### 6.3.4 Site clearing and sanitation materials

Sickles and machetes are needed for cutting grasses and weeds around the apiary. Grease, oil and wood ash should be spread around hive stands as insect guards.

### Harvesting materials

Smokers' knife, honey press, honey container or trays are needed in case of harvesting from traditional and transitional hives and honey extractor and different sizes of sieves are needed in cases of harvesting from wooden framed hives.

## 6.4 Marketing

The general market status, potential and outlets were assessed and market linkage conducted. Market study included market chain identification, seasonal variations in marketing and prices and information on the quality and volumes traded.

Beekeepers from the target sites that included 17 beekeepers from Yerer, 10 from Denkaka, 3 from Adulala and 2 from Godino were interviewed about marketing their products. Honey sellers and *Tej* makers were also identified and interviewed about honey markets in their areas. Five retailers selling honeycombs were interviewed as to where they buy from, where they are selling and for how much. Three *Tej* makers from Dukem town were asked where they buy honey from. Four travellers were interviewed while they were buying the comb honey at Dukem roadsides and asked about the quality of the honey they used to buy. Individual and group discussions were held among the farmers, extension workers and *woreda* experts especially with the cooperative office about the technicality and linkage with potential buyers.

The market chain was followed from beekeepers to retailers in Dukem town and Debre Zeit town. Different honey and beeswax processing and marketing firms such as Beza Mar, Tutu Mar, Tadele and Eastern Shoa Beekeepers Association as well as some supper markets were contacted and accessed their purchasing and selling prices.

The volume of honey sold in Ada'a-Liben area during the major honey flow seasons was estimated to be 45 quintals of non-processed honey per year. The honey market chain in Ada'a-Liben connects beekeepers farmers with retailers in Dukem and Debre Zeit towns and buyers travelling on Debre Zeit–Addis Ababa road and communities living in Debre Zeit and Dukem towns. Almost all honey produced is sold as honeycombs. This method of selling honey brought them attractive price for their product. Local drink '*Tej*' brewers obtain honey from other places because the price of honey sold in the area is not attractive to *Tej* makers. The April 2007 honey produced was sold from ETB 35–45/



kg. Our survey of honey sales in supper markets showed that half a kilogram of processed honey is sold from ETB 25 to 30.

## 6.5 Cooperatives formation

Organizing farmers into cooperatives enables them to access input supply, credit, and information on modern beekeeping as well as to easily share knowledge, expertise and other resources. The Ada'a-Liben *woreda* Cooperatives Promotion Office was communicated, and four beekeepers associations were legally established after conducting a series of meetings and trainings. Beekeepers associations were established and legalized at the four sites (Denkaka, Godino, Yerer and Adulala) (Figure 10).



**Figure 10.** Meeting to establish beekeepers association.

### Methods and processes

- Approached the *woreda* cooperatives organizing office and organized all necessary guidelines and steps as well as procedures to be used to establish the beekeepers cooperatives.
- Approached interested beekeepers from the four pilot sites to organize and form beekeepers associations in their village aggregates.
- Organized individual and group discussions with the farmers to discuss the way forward to develop the beekeeping production system.

- Approached other cooperatives organized under different sectors to draw a lesson.
- The implementers used their own experience and the current situation of the study site to establish the beekeepers' association.

Inputs from *woreda* cooperative office, organized beekeepers from the four pilot sites (Yerer, Godino, Denkaka and Adulala), extension workers, *woreda* experts and IPMS/Sap-Tec were the key actors in the certification of the associations.

The *woreda* cooperative office took the responsibility to legalize the cooperatives and sign a MoU with them. They are responsible for producing a three-year work plan to the newly-formed cooperatives and gave a four-day training to the management bodies of the association on how to run their organizations, as well as on book keeping and marketing of their bee products. Accordingly, the cooperatives are now certified and have legal ground to negotiate with any micro finance institutions to have a credit facility for purchasing bee equipment and others for their firms (Table 6).

**Table 6.** Numbers of beekeepers in the association from each of the four villages

Site	No of kebeles	Number of beekeepers		
		Male	Female	Total
Denkaka	4	19	2	21
Godino	1	17	0	17
Yerer	2	26	0	26
Adulala	3	23	0	23
Total	10	85	2	87

## 6.6 Credit facilitation

The project did its utmost to link the cooperatives to different institutions or partners, like financial institutions (micro credit office) to get credit to purchase bee-equipment and others. However, the interest rate they are charging is reported to be prohibitive and farmers are not encouraged to borrow from these institutions. IPMS in collaboration with Yerer Farmers Union facilitated a credit for members of the three beekeeping service co-operatives. The source for this credit scheme is IPMS, while Yerer Farmers Cooperative Union administers the finance. An important linkage was established with Mekaneyesus office (NGO) at Adulala that provided about 25 modern beehives and other equipment to the cooperative members of that area on credit basis.

### 6.6.1 Credit for transitional beehives

The Ada'a-Liben beekeepers have all the three types of hives (traditional, transitional and modern). Transitional hives are still the dominant ones. Transitional and modern hives are introduced to the area since July 2005 by IPMS and an NGO called Mekaneyesus

that was operating in Ada'a-Liben bringing a remarkable attitudinal change on technical know how and motivated farmers to invest in modern apiary. During this short period of time, farmers were trained, organized, linked to processing and marketing institutions, got experiences from similar business centres, and got scientifically backed demonstrations while their general awareness was also developed.

About 20 farmers from Adulala Peasant Association got one or two complete Langstroth hives each, as well as extractor and wax printer for the cooperative on credit basis from Mekaneyesus Church. They are expecting to harvest more than 30 kg/hive clean and pure honey. The transitional beehive was for the first time introduced in Ada'a-Liben *woreda* by IPMS project. About 71 farmers registered for this credit scheme each requesting three sets of beehives, wax, and bee colony, which need a gross investment of ETB 1407 per individual farmer. Farmers selected for this credit scheme have already received training in apiculture and were organized in four beekeeping cooperatives in four peasant Associations namely: Denkaka, Godino, Yerer Sellassie and Adulala Beekeepers Cooperatives. All the four cooperatives have attained a legal status certificate by the approval of the respective government body. The purpose of the credit proposal was to help farmers acquire transitional beehives as an investment option for income generation through production of honey in quantity and quality for a wider market perspective.

#### Investment cost per individual farmer

Three sets of beehives:	ETB 1050 (ETB 350 per beehive × 3)
Wax	ETB 57 (ETB 19 per beehive × 3)
Bee colony	ETB 300 (ETB 100 per beehive × 3)
Total	= ETB 1407

IPMS finances the credit and Yerer Farmers Union manages the credit fund. Yerer Farmers Union issues loan with 25% down payment with a credit recovery period of one year. The total amount of money to be transferred to Yerer Farmers Union current bank account for this particular apiculture project in Ada'a-Liben will be (ETB 99,897 × 25%) = ETB 74,922.75. Estimated period for return of investment is a minimum of 12 months. It is estimated that income from the three transitional beehives will be (17 kg/hive per harvest × 30 ETB × 2 × 3 hives =) ETB 3060. The average total investment cost per farmer for the first year will be 1407 and the difference will be ETB 1653, which is profit. Starting from the second year of the harvest framers will get a net profit of ETB 3060 per year.

The credit status of this year shows that only 13 farmers or 18% of those registered paid 25% down payment for credit processing. The low down payment rate is due to the fact that the scheme has been delayed for different administrative procedure and commenced

on late June when farmers were busy with seasonal agricultural activities. The number of credit users is hoped to grow in the coming January during the off-season.

## 6.7 Capacity building

### 6.7.1 Training

Step-by-step intervention strategy that includes capacity building and studies were followed. The activities include training and demonstrations, improvement of the existing production system, introduction of improved hives starting with transitional hives usually referred to as Kenyan top-bar (KTB) and the introduction of modern hives known as Langstroth hive.

Sap-Tec in collaboration with IPMS, MoARD, Holleta Bee Research Center and *Woreda* Office of Agriculture and Rural Development conducted a four-day training program on modern beekeeping techniques in December 2006. In the training, 60 beekeepers from the 4 pilot sites, 4 extension workers, 2 private beekeeping collaborators, 2 *woreda* agriculture office experts, and 1 *woreda* cooperative office expert participated (Figure 11).

### 6.7.2 Demonstration and visits

Consecutive on-farm practical training and demonstrations were given to the organized beekeepers (Figure 12) and development agents (DA) in the respective villages. Colony transfer from traditional hives to transitional hives (Kenyan top-bar, KTB) was demonstrated. Colony, beehive management, and bee product management were demonstrated. Representative farmers were also taken on educational tours to Alagea TVET and Beza Mar PLC in Adama to witness modern apiculture production, processing and marketing systems (Figure 13).



**Figure 11.** *Training of farmers, extension workers and woreda experts.*



**Figure 12.** *Farmers' practical training on technology transfer.*



**Figure 13.** *Educational tour to Alagea TVET and Beza Mar PLC.*



## 7 Impact of the interventions

Due to all these interventions, i.e. awareness creation, demonstration, training, exposure visits, hive and hive product management, average yield per traditional hive per season increased by about 40% in 2006 (5.33 kg/hive per season) compared to the average yield in 2005 (3.8 kg/hive per season) (Table 7).

**Table 7.** Average honey production in the four pilot areas (from July 2005 to December 2006)

Rural kebeles	Average yield in kg/hive per season (2005–07)								
	Traditional			Transitional			Modern		
	July 2005	November 2006	June 2007	July 2005	November 2006	June 2007	July 2005	November 2006	June 2007
Yerer	4.6	5.51	7.5	–	31.5	35	14.4	35	37
Adulala	3.9	4.23	5.5	–	//	35.0	15	30	35
Godino	3.2	3.75	5.0	–	//	25.0	–	–	–
Denkaka	3.5	5.33	7.0	–	32.5	63.0	–	–	–

Among the few recorded experiences from the transitional hives was that of W/ro Elfinesh, a woman farmer from Denkaka Peasant Association. She collected 55 kg of honey from 2 transitional hives in 2 harvests beginning in October to the end of November 2006. She sold the honey at ETB 30/kg at the local market. She harvested about 17 kg of honey from one transitional hive; comparing the productivity with traditional hives the yield was threefold. The other advantage of transitional beehives is that, unlike the modern beehives, it does not need accessories for harvest. The current honey-comb price harvested from transitional and traditional beehives is more attractive to farmers compared to pure honey price extracted from modern beehives.



**Figure 14.** Some technologies may not be appropriate in all places at the same time.

If you do what you did, you get what you got!



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